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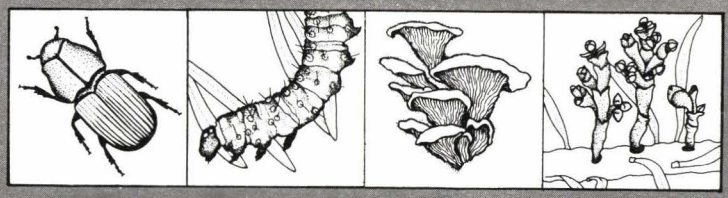
Forest Insect & Disease Management



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A DEMONSTRATION OF BASAL AREA CUTTING TO MANAGE MOUNTAIN PINE BEETLE IN SECOND-GROWTH PONDEROSA PINE

PROGRESS REPORT NO. 1

By

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INTRODUCTION

The mountain pine beetle, Dendroctonus ponderosae Hopk., is the major bark beetle pest of second-growth ponderosa pine, Pinus ponderosae Laws, in the northwestern United States. Evidence indicates that low tree vigor caused by intensive between-tree competition underlies the occurrence of beetle outbreaks.

Sufficient data show that thinning second-growth ponderosa pine stands will increase tree growth and reduce mortality caused by the beetle. However, limiting thinning to only one level of basal area cutting is not a sound, viable alternative to prevent or reduce mountain pine beetle infestation in all second-growth ponderosa pine stands in Montana.

Therefore, a demonstration of various basal area cuttings to prevent infestation in green stands and reduce active infestation in second-growth ponderosa pine stands by changing stand dynamics has been established in Montana. This demonstration is a cooperative effort between the Lewis and Clark National Forest, Bureau of Land Management, Forest Insect and Disease Management, R-1, and Research Work Unit 2201, Intermountain Forest and Range Experiment Station.

OBJECTIVES

This demonstration has the following objectives:

A. Apply recommended cutting strategies prior to or within 1-2 years after stands have become infested, i.e., prevent an outbreak from developing or reduce an infestation that has developed to epidemic level by changing stand dynamics.

B. Manage through regeneration and post cut techniques to obtain maximum wood fiber production.

C. Increase knowlege on beetle/host tree interaction and consequences in these managed stand situations.

D. Manage forest cover to attain full potential for timber production consistent with management of key values such as soil and water. This objective implies desirable stocking levels of disease-free growing stock of desired species.

ROCKY MOUNTAIN FOREST AND RANGE EXPERIMENT STATION

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METHODS

Two areas have been selected for this demonstration. The first, administered by the Judith Ranger District, covers approximately 660 acres south of Tollgate Mountain. The second area covers about 450 acres and is located on BLM land near the South Fork of Flatwillow Creek (figure 1).

In each area twelve 15- to 20-acre blocks were established. The following precut data was collected from each block to determine cutting strategies and volume to be removed from green and infested stands:

- Diameter-Phloem distribution/diameter class
- Basal area stems/acre
- Site index
- Habitat type
- Elevation
- Infested trees/acre
- Strip attacks/acre
- Pitchouts/acre
- Dwarf mistletoe rating class
- Aspect
- Slope
- Soil type

RESULTS

All blocks have been established and cruised. The precut data appears in tables 1 and 2. Cutting strategies for each block have been determined, and cutting bids will be advertised this spring. However, current market conditions may preclude the purchase of these sales.

Logged units will be recruised following beetle flight, 1980, and the infestation intensity data compared with precut information. Any units not cut will be recruised to update precut information.

Following logging, comparisons will be made to show the relationship between the various cutting prescriptions, stand parameters, and the number of attacked trees/acre.

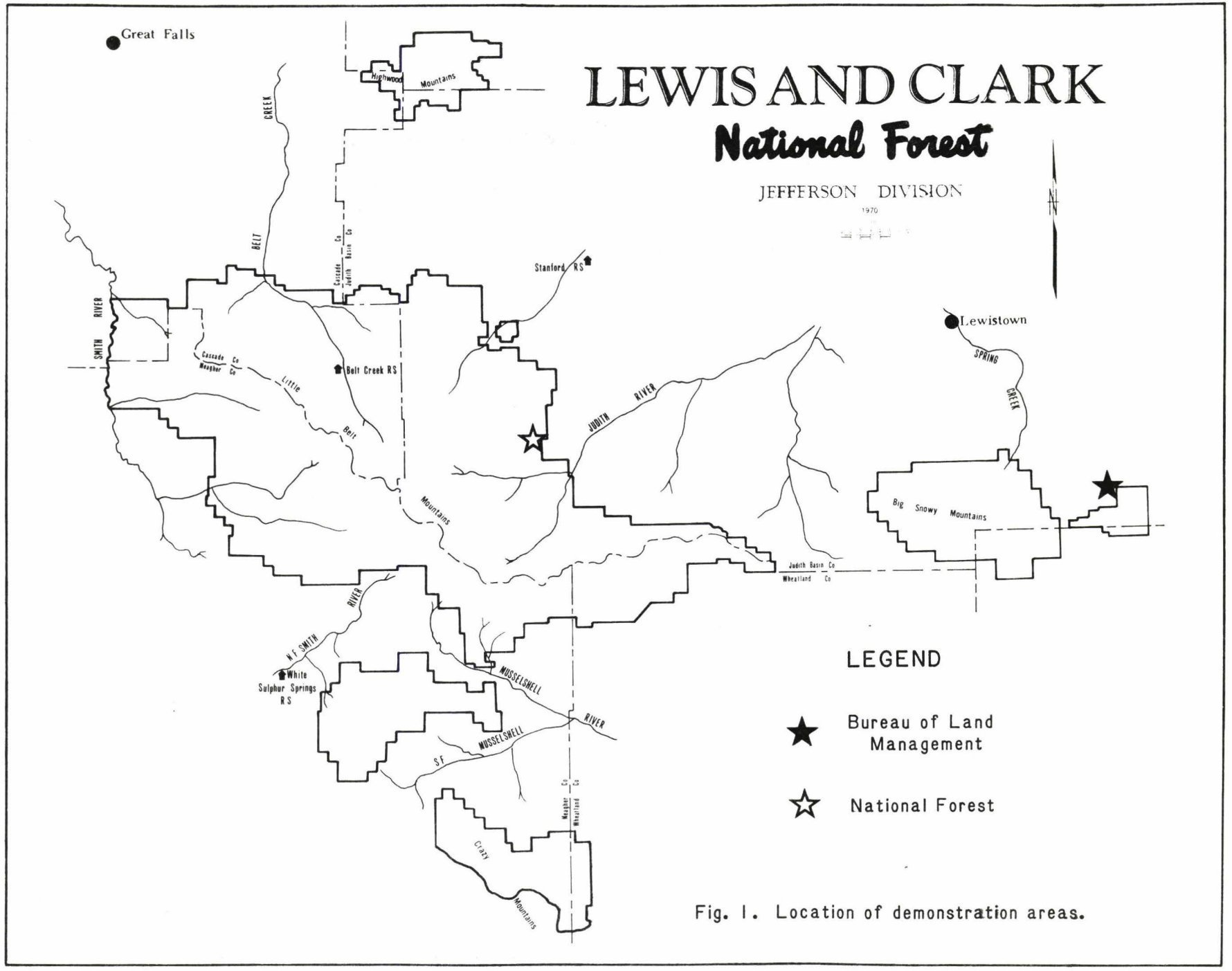

Fig. 1. Location of demonstration areas.

Table 1.--Unit information: BLM demonstration blocks, Lewistown, MT, 1979

Unit No.	Acres	Habitat type	Elevation	Aspect	Slope	Soil type	Designated cut	Basal area of green stand	Mean diameter (inches)				Attacked trees/acre				
									Green stand	1979 attacks	1978 attacks	Older attacks	1977	1978	1979	Strips	Pitch-outs
1-1	17.6	310 Psme/Syal	5,650	350°	5%	Hughsvile Tibs White Cal Complex	Control	9.8	8.9"	NA	10.5"	9.9"	7.7	1.3	0	0.0	1.0
1-2	16.0	170 Pipo/Syal	5,350	0	0	Hughsvile Tibs White Cal Complex	Control	10.1	10.4	9.3"	7.9	10.2	21.2	.4	.8	0	.8
1-3	16.0	170 Pipo/Syal	5,300	60	9	Hughsvile Tibs White Cal Complex	Control	10.5	10.4	NA	11.3	10.1	6.0	1.1	0	.6	1.4
2-1	16.0	310 Psme/Syal	5,570	45	5	Hughsvile Tibs White Cal Complex	80 BA	12.0	10.6	13.2	15.2	11.4	19.3	3.8	1.0	.3	3.0
2-2	16.0	310 Psme/Syal	5,600	20	14	Hughsvile Tibs White Cal Complex	80 BA	11.1	10.1	9.4	16.0	10.9	29.4	.9	.6	.3	4.3
2-3	14.4	340 Psme/Spbe	5,700	1	8	Hughsvile Tibs White Cal Complex	80 BA	9.4	9.2	7.3	9.1	9.5	26.3	104.7	.7	0	3.0
3-1	17.6	480 Picea/Smst	5,900	30	10	Hughsvile Tibs White Cal Complex	100 BA	10.1	9.2	12.3	9.8	10.0	7.0	1.2	.8	.1	1.1
3-2	14.4	480 Picea/Smst	5,750	10	10	Tibs White Cal Koply Clay Loam	100 BA	9.8	9.1	8.9	9.7	10.2	4.9	1.8	1.4	0	1.9
3-3	16.0	310 Psme/Syal	5,650	350	15	Hughsvile Tibs White Cal Complex	100 BA	9.6	9.2	11.1	8.7	9.3	10.3	1.8	.8	.5	.7
4-1	17.6	480 Picea/Smst	5,800	310	20	Tibs White Cal Koply Clay Loam	120 BA	10.5	9.0	8.5	11.2	10.6	5.1	1.1	.2	.1	.8
4-2	14.4	350 Psme/Aruv	5,600	360	5	Hughsvile Cal White Cal Complex	120 BA	9.8	8.9	10.3	10.9	9.7	70.7	1.0	3.2	.2	2.7
4-3	16.0	310 Psme/Syal	5,700	350	5	Hughsvile Cal White Cal Complex	120 BA	9.9	9.8	15.4	0	9.4	5.4	0	.6	.2	1.6

Table 2.--Unit information: L&C demonstration blocks, Stanford, MT, 1979

Unit No.	Acres	Habitat type	Elevation	Aspect	Scope	Soil type	Designated cut	Basal area of green stand	Mean diameter (inches)				Attacked trees/acre				
									Green stand	1979 attacks	1978 attacks	Older attacks	1977	1978	1979	Strips	Pitch-outs
1	16.0	350 Psme/Arvu	5,400	230°	17%	Lithic & Typic Cryorthents	80 BA	94	9.3"	12.5"	10.1"	10.0"	23.0	0.6	0.8	0.2	3.8
2	13.0	350 Pipo/Aruv	5,400	230	26	Lithic & Typic Cryorthents	Control	119	9.9	12.3	NA	10.4	18.9	0	.6	0	8.3
3	14.0	330 Pipo/Cage	5,700	120	15	Lithic & Typic Cryorthents & Typic Cryochrepts	120 BA	141	8.7	9.8	9.5	10.5	1.6	3.4	.6	.1	1.4
4	15.0	360 Psme/Juco	5,900	110	15	Typic Cryochrepts LSK	Control	117	7.1	10.1	7.1	7.8	1.3	.3	.3	0	1.0
5	17.0	330 Psme/Cage	5,700	155	20	Typic Cryochrepts & Typic Cryoborolls	80 BA	101	8.1	6.8	8.0	8.5	.8	.7	.2	0	1.0
6	15.0	360 Psme/Juco	5,700	160	12	Typic Cryochrepts & Typic Cryoborolls	100 BA	105	7.9	NA	8.9	7.0	.4	.2	0	0	.2
7	17.0	324 Psme/Caru	5,700	80	5	Typic Cryochrepts LSK	80 BA	96	8.4	10.9	10.7	10.7	3.3	1.3	.6	.1	
8	16.0	330 Psme/Cage	5,600	320	6	Typic Cryochrepts & Typic Cryoborolls	120 BA	150	8.8	NA	NA	NA	0	0	0	8.9	0
9	15.0	282 Psme/Vagl	5,600	90	6	Typic Cryochrepts & Typic Cryoborolls	100 BA	139	9.3	13.0	7.9	10.1	7.7	.4	.1	.3	2.4
10	12.0	282 Psme/Vagl	5,600	150	10	Typic Cryochrepts	100 BA	133	9.5	NA	12.1	10.4	3.5	1.0	0	.3	1.5
11	15.0	313 Psme/Syal	5,600	90	7	Typic Cryochrepts & Typic Cryoborolls	120 BA	171	9.0	11.9	NA	8.8	2.4	0	.2	.4	1.6
12	14.0	313 Psme/Syal	5,900	120	25	Typic Cryochrepts	Control	125	8.5	NA	18.4	8.9	9.2	.4	0	.8	3.2